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These volumes have been prepared primarily for the non-specialist, more especially for workers in stratigraphic geology who have not received special training in paleontology. For such workers, as well as for geological students in colleges and universities, and for amateur paleontologists and collectors of fossils, the volumes will prove to be of great value.

S. W.

Olenellus and Other Genera of the Mesonacidae. By CHARLES D. WALCOTT, Smithsonian Miscellaneous Collections, LV, No. 6.

In his memoir on the *Olenellus* fauna, published in the *Tenth Annual Report of the United States Geological Survey*, in 1891, Walcott recognized seven American and three foreign species of *Olenellus*, included in three subgeneric groups, *Olenellus* proper, *Mesonacis*, and *Holmia*. The present contribution represents the advance of knowledge concerning this highly interesting group of Cambrian trilobites since the appearance of the earlier memoir. Thirty-four species, including two varieties, are now recognized, besides two undetermined ones, thirty-six in all, arranged in ten groups which are given full generic rank, the entire group of forms being elevated to a family under the name *Mesonacidae*. Twenty-four of these forms are American and twelve foreign, the foreign representatives being known only from northwestern Europe.

With the restriction of the genus *Olenellus* to include only one group of these species, it comes about that this genus is no longer characteristic of the entire Lower Cambrian, as has commonly been assumed since the publication of the earlier memoir, but occurs only in the uppermost division of the series. In the present paper the Lower Cambrian is divided into four faunal zones, designated, beginning with the oldest, (1) *Nevadia* zone, (2) *Elliptocephala* zone, (3) *Callavia* zone, (4) *Olenellus* zone, each named from the leading Mesonacid genus present in the fauna. Aside from these four index genera the following are recognized: *Mesonacis* Walcott, *Holmia* Matthew, *Wanneria* n. gen., *Paedeumias* n. gen., *Peachella* n. gen., and *Olenelloides* Peach.

In their genetic relations the genera discussed are assumed to diverge along two lines from the primitive *Nevadia*. The one line includes *Callavia*, *Holmia*, and *Wanneria* in order, the last of which is supposed to give origin to *Paradoxides* of the Middle Cambrian. The second line of descent springing from *Nevadia* includes *Mesonacis*, *Elliptocephala*, *Paedeumias*, and *Olenellus* in serial order, the last of these genera giving origin on the one hand to *Peachella* and on the other hand to *Olenelloides*.

Some question may be raised, perhaps, as to the legitimacy of the assumption of such a phylogenetic origin of *Paradoxides*. The most diagnostic character of the entire family *Mesonacidae* is the absence of a facial suture, although well-developed compound eyes are present. Elsewhere among the trilobites, where the free and fixed cheeks have become anchylosed, with the consequent disappearance of the facial suture, as, for instance, in the Devonian genus *Phacops*, this character has appeared at the termination of a long phylogenetic line in which all the earlier members possess functional facial sutures. The facial suture is so characteristic of every order and every family of trilobites, save the *Mesonacidae*, that one is forced to the assumption that it was a character of the primitive stock from which all have sprung. It therefore seems necessary to assume that the ancestors of the *Mesonacidae* possessed a functional facial suture, and that the absence of this character in this group of genera is indicative of its terminal position in a long phylogenetic line whose pre-Cambrian history is unknown to us. Since such a character when once lost cannot be restored again, it would follow that *Paradoxides* with its functional facial suture could not have originated from any member of the *Mesonacidae*. Might it not be assumed that *Paradoxides* arose from a totally distinct phylogenetic line in a different early Cambrian biologic province, perhaps southern Europe, and later migrated into the North Atlantic province where it occurs in strata generally younger than those bearing the Mesonacid faunas? Under such an interpretation it would be necessary to grant that somewhere *Paradoxides* may have been contemporaneous with at least a portion of the Mesonacid faunas in North America, and this contemporaneity may even have extended to the North American shore of the North Atlantic basin.

The paper adds much to our knowledge of these very ancient faunas of the earth, and the author is to be congratulated upon the success of his most persistent search for these rare fossil forms. Not the least attractive portion of the paper are the twenty-two beautifully executed half-tone plates.

S. W.

Elements of Geology. By ELIOT BLACKWELDER AND HARLAN H. BARROWS. Pp. 475; figs. 485; pls. 16. New York: American Book Co., 1911.

This is not a manual or reference book, but an elementary textbook intended primarily for use by young students in the high schools, acade-